



[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[NRC-2012-0068]

Mitigation Strategies for Beyond-Design-Basis External Events

AGENCY: Nuclear Regulatory Commission.

ACTION: Draft interim staff guidance; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is soliciting public comment on its draft Japan Lessons-Learned Division Interim Staff Guidance (JLD-ISG), JLD-ISG-2012-01, Draft Revision 1, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events." This draft JLD-ISG revision provides guidance and clarification to assist nuclear power reactors applicants and licensees with the identification of measures needed to comply with requirements to mitigate challenges to key safety functions.

DATES: Submit comments by **[INSERT DATE 30 DAYS FROM DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure consideration only for comments received before this date.

ADDRESSES: You may submit comments by any of the following methods (unless this document describes a different method for submitting comments on a specific subject):

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID **NRC-2012-0068**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **Mail comments to:** Cindy Bladey, Office of Administration, Mail Stop: OWFN-12-H08, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

For additional direction on obtaining information and submitting comments, see “Obtaining Information and Submitting Comments” in the SUPPLEMENTARY INFORMATION section of this document.

FOR FURTHER INFORMATION CONTACT: Eric Bowman, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-2963; e-mail: Eric.Bowman@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID **NRC-2012-0068** when contacting the NRC about the availability of information for this action. You may obtain publicly-available information related to this action by any of the following methods:

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID **NRC-2012-0068**.

- **NRC’s Agencywide Documents Access and Management System (ADAMS):**

You may obtain publicly-available documents online in the ADAMS Public Documents collection at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select “[ADAMS Public Documents](#)” and then select “[Begin Web-based ADAMS Search](#).” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov.

- The documents identified in the following table are available to interested persons through one or more of the following methods, as indicated.

DOCUMENT TITLE	ABBREVIATED TITLE	ADAMS ACCESSION NO.
JLD-ISG-2012-01, “Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,” Draft Revision 1	JLD-ISG-2012-01, Draft Revision 1	ML15294A078
See Previous Entry for JLD-ISG-2012-01	JLD-ISG-2012-01, Revision 0	ML12229A174
Order EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events”	Order EA-12-049	ML12054A736
V.C. Summer Nuclear Station, Unit 2 License, License No. NPF-93	n/a	ML14100A092
V.C. Summer Nuclear Station, Unit 3 License, License No. NPF-94	n/a	ML14100A101
Enrico Fermi Nuclear Plant, Unit 3 License, License No. NPF – 95	n/a	ML15084A170

SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan"	SECY-11-0093	ML11186A950
SECY-11-0124, "Recommended Actions to be Taken without Delay from the Near-Term Task Force Report"	SECY-11-0124	ML11245A158
SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned"	SECY-11-0137	ML11272A111
Commission's staff requirements memorandum (SRM) for SECY-11-0093	SRM-SECY-11-0093	ML112310021
SRM for SECY-11-0124 (see entry to SECY-11-0124 for full title)	SRM-SECY-110124	ML112911571
SRM for SECY-11-0137 (see entry to SECY-11-0124 for full title)	SRM-SECY-11-0137	ML113490055
Nuclear Energy Institute (NEI) Letter Titled, "An Integrated, Safety-Focused Approach to Expediting Implementation of Fukushima Daiichi Lessons Learned"	n/a	ML11353A008
SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami"	SECY-12-0025	ML12039A103
SRM for SECY-12-0025 (see entry for SECY-12-0025 for full title)	SRM-SECY-12-0025	ML120690347
Request for Information Pursuant to Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident	50.54(f) Letter	ML12053A340
NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision B	NEI 12-06, Revision B	ML12144A419
NEI 12-06, Revision B1 (See Previous Entry for NEI 12-06)	NEI 12-06, Revision B1	ML12143A232

"NRC Response to Public Comments, JLD-ISG-2012-01 (Docket ID NRC-2012-0068)"	n/a	ML12229A253
NEI 12-06, Revision C (See Previous Entry for NEI 12-06)	NEI 12-06, Revision C	ML121910390
NEI 12-06, Draft Revision 0 (See Previous Entry for NEI 12-06)	NEI 12-06, Draft Revision 0	ML12221A204
See Previous Entry for JLD-ISG-2012-01	JLD-ISG-2012-01, Draft Revision 0	ML12146A014
Vermont Yankee Nuclear Power Station's Overall Integrate Plan	n/a	ML13064A300
COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation (sic) of Flooding Hazards"	COMSECY-14-0037	ML14238A616
SRM-COMSECY-14-0037	SRM-COMSECY-14-0037	ML15089A236
NEI 12-06, Revision 1 (See Previous Entry for NEI 12-06)	NEI 12-06, Revision 1	ML15244B006
NEI 12-06, Revision 1A (See Previous Entry for NEI 12-06)	NEI 12-06, Revision 1A	ML15279A425
NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor"	NUREG-2161	ML14255A365

- The NRC may post materials related to this document, including public comments, on the Federal rulemaking Web site at <http://www.regulations.gov> under Docket ID **NRC-2012-0068**. The Federal rulemaking Web site allows you to receive alerts when changes or additions occur in a docket folder. To subscribe: 1) Navigate to the docket folder (**NRC-2012-0068**); 2) click the "Sign up for E-mail Alerts" link; and 3) enter your e-mail address and select how frequently you would like to receive e-mails (daily, weekly, or monthly).

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

B. Submitting Comments

Please include Docket ID **NRC-2012-0068** in your comment submission.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC posts all comment submissions at <http://www.regulations.gov> as well as entering the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment submissions into ADAMS.

II. Background

The NRC staff issued JLD-ISG-2012-01 Revision 0 on August 29, 2012. The NRC staff developed JLD-ISG-2012-01 Draft Revision 1 to provide further guidance and clarification to assist nuclear power reactor applicants and licensees with the identification of measures needed to comply with requirements to mitigate challenges to key safety functions. These requirements are contained in Order EA-12-049. In addition, these requirements are included in the following license conditions: Virgil C. Summer Nuclear Station, Unit 2 License (V.C.

Summer), License No. NPF-93, Condition 2.D.(13), V.C. Summer Nuclear Station, Unit 3 License, License No. NPF-94, Condition 2.D.(13), and Enrico Fermi Nuclear Plant, Unit 3 License, License No. NPF-95, Condition 2.D.(12)(g). The draft ISG is not a substitute for the requirements in Order EA-12-049, and compliance with the ISG is not required. This ISG revision is being issued in draft form for public comment to involve the public in development of the implementation guidance.

Following the events at the Fukushima Dai-ichi nuclear power plant on March 11, 2011, the NRC established a senior-level agency task force referred to as the Near-Term Task Force (NTTF). The NTTF was tasked with conducting a systematic and methodical review of the NRC regulations and processes, and determining if the agency should make additional improvements to these programs in light of the events at Fukushima Dai-ichi. As a result of this review, the NTTF developed a comprehensive set of recommendations, documented in SECY-11-0093, dated July 12, 2011. These recommendations were enhanced by the NRC staff following interactions with stakeholders. Documentation of the staff's efforts is contained in SECY-11-0124, dated September 9, 2011, and SECY-11-0137, dated October 3, 2011.

As directed by the Commission's SRM for SECY-11-0093, the NRC staff reviewed the NTTF recommendations within the context of the NRC's existing regulatory framework and considered the various regulatory vehicles available to the NRC to implement the recommendations. SECY-11-0124 and SECY-11-0137 established the staff's prioritization of the recommendations.

After receiving the Commission's direction in SRM-SECY-11-0124 and SRM-SECY-11-0137, the NRC staff conducted public meetings to discuss enhanced mitigation strategies intended to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities following beyond-design-basis external events. At these meetings, the industry

described its proposal for a Diverse and Flexible Mitigation Capability (FLEX), as documented in NEI's letter, dated December 16, 2011. FLEX is proposed as a strategy to fulfill the key safety functions of core cooling, containment integrity, and spent fuel cooling. Stakeholder input influenced the staff to pursue a more performance-based approach to improve the safety of operating power reactors than was originally envisioned in NTTF Recommendation 4.2, SECY-11-0124, and SECY-11-0137.

On February 17, 2012, the NRC staff provided SECY-12-0025 to the Commission, including the proposed order to implement the enhanced mitigation strategies. As directed by SRM-SECY-12-0025, the NRC staff issued Order EA-12-049 and, in parallel, issued as a Request for Information under 10 CFR 50.54(f) for a reevaluation of licensees' flooding and seismic hazards.

Guidance and strategies required by the order would be available if the loss of power, motive force and normal access to the ultimate heat sink to prevent fuel damage in the reactor, and SFP affected all units at a site simultaneously. The order requires a three-phase approach for mitigating beyond-design-basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment, and SFP cooling. The transition phase requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from off site. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.

On May 4, 2012, NEI submitted document 12-06, Revision B, and on May 13, 2012, Revision B1, to provide specifications for an industry-developed methodology for the

development, implementation, and maintenance of guidance and strategies in response to the mitigating strategies order. The strategies and guidance described in NEI 12-06 expand on the strategies the industry developed and implemented to address the limited set of beyond-design-basis external events that involve the loss of a large area of the plant due to explosions and fire required pursuant to paragraph (hh)(2) of 10 CFR 50.54(f), “Conditions of licenses.”

On May 31, 2012, the NRC staff issued a draft version of JLD-ISG-2012-01, Revision 0, and published a notice of its availability for public comment in the *Federal Register* (FR) (77 FR 33779; June 7, 2012), with the comment period running through July 7, 2012, 30 days from its publication. The staff received seven comments during this time, addressing the comments, as documented in “NRC Response to Public Comments, JLD-ISG-2012-01 (Docket ID **NRC-2012-0068**).”

On July 3, 2012, NEI submitted Revision C to NEI 12-06, incorporating many of the exceptions and clarifications included in the draft version of this ISG. On August 3, 2012, NEI submitted Draft Revision 0 to NEI 12-06, incorporating many of the remaining exceptions and clarifications. On August 21, 2012, NEI submitted Revision 0 to NEI 12-06, making various editorial corrections. The NRC reviewed the August 21, 2012, submittal of Revision 0 of NEI 12-06 and endorsed it as a process the NRC considers acceptable for meeting the regulatory requirements with noted clarifications in revision 0 of JLD-ISG-2012-01.

By February 2013, licensees of operating power reactors submitted their overall integrated plans (OIPs) under the Mitigating Strategies order describing the guidance and strategies to be developed and implemented. Because this development and implementation was to be accomplished in parallel with the reevaluation of the seismic and flooding hazards under the 10 CFR 50.54(f) letter issued subsequent to SECY-12-0025, these included in their key assumptions a statement that typically read, “[f]lood and seismic re-evaluations pursuant to

the 10 CFR 50.54(f) letter of March 12, 2012, are not completed and therefore not assumed in this submittal. As the reevaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule commensurate with other licensing bases changes.” (See, e.g., Vermont Yankee Nuclear Power Station’s OIP)

In order to clarify the relationship between the Mitigating Strategies order and the hazard reevaluation, the NRC staff provided COMSECY-14-0037 to the Commission on November 21, 2014, requesting that the Commission affirm that “[l]icensees for operating nuclear power plants need to address the reevaluated flooding hazards within their mitigating strategies for beyond-design-basis external events (Order EA-12-049 and related [Mitigation of Beyond-Design-Basis Events] MBDDBE rulemaking).” COMSECY-14-0037 further requested affirmation that “[l]icensees for operating nuclear power plants may need to address some specific flooding scenarios that could significantly damage the power plant site by developing targeted or scenario-specific mitigating strategies, possibly including unconventional measures, to prevent fuel damage in reactor cores or spent fuel pools.” In SRM-COMSECY-14-0037, the Commission affirmed these two items and noted that “it is within the staff’s authority, and is the staff’s responsibility, to determine, on a plant-specific basis, whether targeted or scenario-specific mitigating strategies, possibly including unconventional measures, are acceptable.”

On August 25, 2015, NEI submitted Revision 1 to NEI 12-06, incorporating lessons learned in the implementation of Order EA-12-049 and alternative approaches taken by licensees for compliance to that order. Following a public webinar discussion of potential exceptions and clarifications that took place on September 21, 2015, NEI submitted Revision 1A to NEI 12-06 on October 5, 2015.

III. Specific Request for Comment

The NRC is seeking advice and recommendations from the public on the revision to this interim staff guidance document. We are particularly interested in comments and supporting rationale from the public on the following:

Spent Fuel Pool (SFP) Spray strategy: Order EA-12-049 was issued in parallel with the March 12, 2012, request for information under 10 CFR 50.54(f) for reevaluation of seismic and flooding hazards. The order and the guidance developed to support the development and implementation of the mitigating strategies were intended to address the uncertainties associated with beyond-design-basis external events. Since March 12, 2012, the NRC has completed NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor," which predicted an SFP liner failure likelihood of about two times in a million years and a possibility of release of radioactive materials only if that liner failure occurs during 8 percent of the operating cycle of the reference plant considered in the study. The results of the study showed that the risk of individual latent cancer fatality within 10 miles of the reference plant due to the effects of a beyond-design-basis earthquake on the SFP is several orders of magnitude below the quantitative health objectives established in the Commission's safety goal policy, "Safety Goals for the Operations of Nuclear Power Plants," 51 FR 28044, August 4, 1986, as corrected and republished at 51 FR 30028, August 21, 1986. These results did not quantitatively credit the existing SFP spray strategy under 10 CFR 50.54(hh)(2), which would be necessary for conformance with the guidance contained in this revision to JLD-ISG-2012-01 through its endorsement of NEI 12-06, Revision 1A, at Tables C-3 and D-3 for boiling-water reactors and pressurized-water reactors, respectively. The NRC seeks comment on whether continuing to require the SFP spray

strategy under Order EA-12-049 is warranted in light of the analyses performed for NUREG-2161, or whether the need for this strategy should be limited or removed.

PROPOSED ACTION

By this action, the NRC is requesting public comments on JLD-ISG-2012-01 Draft Revision 1. This draft JLD-ISG proposes guidance related to requirements contained in Order EA-12-049, Mitigation Strategies for Beyond-Design-Basis External Events. The NRC staff will make a final determination regarding issuance of the JLD-ISG after it considers any public comments received in response to this request.

Dated at Rockville, Maryland, this 4th day of November, 2015.

FOR THE NUCLEAR REGULATORY COMMISSION.

Stewart N. Bailey, Acting Director,
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Office of Nuclear Reactor Regulation

[FR Doc. 2015-28593 Filed: 11/9/2015 8:45 am; Publication Date: 11/10/2015]